MONTHLY WEATHER REVIEW

AEROLOGICAL OBSERVATIONS

[The Aerological Division, W. R. Gregg, in charge]

By L. T. SAMUELS

Free-air temperatures during October averaged below normal at the northern stations and above normal at the southern stations. The largest negative departures occurred at Ellendale and the largest positive departures at Atlanta. Relative humidities were mostly above normal except in the higher levels at Atlanta and San Diego and in the lower levels at Dallas. The largest departures were positive and occurred at Cleveland and

Free-air resultant wind velocities were in general higher than the normals. Resultant directions were close to normal except on the Pacific coast, where a preponderance of northerly components prevailed.

Airplane observations were made daily at Cleveland, Dallas, and Omaha throughout the month and on all but three days at Atlanta and Chicago, when bad flying weather interfered. Five airplane observations were made at Fairbanks, Alaska, in connection with the International Polar Year; also, a total of 73 sounding balloons were released at Dallas, Ellendale, and Omaha between August and November, 1932, inclusive, of which 48 have been returned to date (December 1, 1932). In nearly every case the balloons penetrated the stratosphere.

Table 1.—Free-air temperatures and relative humidities during October, 1932

							TE	MPER	LATUR	E (° C.)									
	Atlanta, Ga. (303 meters) ¹		Chicago, Ill. (195 meters) ²		Cleveland, Ohio (246 meters) ²		Dallas, Tex. (146 meters) ³		Ellendale, N. Dak. (444 meters)		Norfolk, Va. (3 meters) 4		Omaha, Nebr. (300 meters) ⁵		Pensacola, Fla. (2 meters) 4		San Diego, Calif. (9 meters) 4		Washington, D. C. (2 meters) 4	
Altitude (meters) m. s. l.	Mean	Departure from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal	Mean	Departure from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal	Mean	Depar- ture from normal
Surface 500 1,000 1,500 2,000 2,000	13. 5 13. 8 12. 2 10. 7	(6) (6) +1. 6 +2. 2 +2. 6	7. 6 8. 2 7. 0 5. 4 3. 9	(6) (6) -1.9 -1.2 -0.3	9. 9 10. 7 9. 3 6. 5 4. 3	(6) (6) +0.4 -0.1 +0.1	13. 1 16. 3 15. 7 14. 1 12. 1	(6) (6) +0.6 +1.0 +1.2	5. 3 5. 1 3. 8 1. 9 0. 4	-1.9 -2.2 -2.8 -3.1 -2.4	15. 2 13. 9 11. 6	+0.4 +0.6	6. 7 7. 7 9. 0 7. 2 5. 6	(6) (6) -0.2 -0.5 +0.1	15. 8 16. 0 15. 5	-2.3 -1.5 -0.1 +1.2	17. 2 16. 6 16. 7	-2.5 -1.5 -0.7 +0.1	10. 0 9. 5 8. 4	-3. 1 -2. 7 -1. 8
2,500 3,000 4,000 5,000	8. 6 6. 7 0. 7 -6. 1	+2.6 +3.0 +2.3 +1.1	1. 6 -1. 0 -6. 4 -12. 6	-0.3 -0.5 -0.8 -1.7	1.8 -0.7 -5.8 -12.4	-0.1 -0.2 -0.2 -1.5	10.1 7.9 3.2 -2.4	+1.6 +1.8 +2.3 +1.5	-1.6 -4.2 -9.1	-1. 9 -1. 7 -1. 0	3. 6 -1. 4		3. 5 1. 0 -5. 1 -12. 1	+0.1 +0.6 +0.8 -0.1 -1.2	9. 0 3. 8 -0. 5	+1.4 +1.5 +1.5	8. 9 3. 4 -3. 5	+0.4 +0.4 +0.4	1.8	-0. 5
RELATIVE HUMIDITY (PER CENT)																				
Surface	88 81 69 61	(6) (6) +7 +3	78 69 65 59	(6) (6) +3 +2	78 71 70 70	(6) (6) +8 +13	81 63 54 53	(6) (6) -10 -5	72 72 70 67	+4 +6 +12 +14	82 75 68	+7 +8 +5	78 70 55 53	(6) (6) -1 0	84 75 70	+5 +4 +3	67 62 42	+3 +2 -4	76 68 63	+3 +5 +3

Surface	88 81 69 61	(6) (7) +7 +3	78 69 65 59	(6) (6) +3 +2	78 71 70 70	(6) (6) +8 +13	81 63 54 53	(6) (6) -10 -5	72 72 70 67	$^{+4}_{+6}$ $^{+12}_{-14}$	82 75 68	+7 +8 +5	78 70 55 53	(6) (6) -1	84 75 70	+5 +4 +3	62 42	+3 +2 -4	76 68 63	+3 +5 +3
2,000	48 44	-3 -3	57 54	+4 +6	65 63	$+12 \\ +15$	52 49	$\begin{array}{c c} -5 \\ 0 \\ +2 \end{array}$	65	+15 +15	65	+12	50 48	-3 -4	58	+2	25	-8	55	—i
3,000 4,000 5,000	39 31 27	-4 -8 -12	54 48 42	+8 +5 +10	62 52 52	+16 +9 +20	46 44 - 42	+4 +4	62 54	+16 +9	58 54	+15 +15	50 46	0	51 47	+4 +4	20 17 15	-7 -7	41	-2
5,000	21	-12	42	+10	52	+20	- 42	7-0					4.	74	*1	+4	15	-1		

Table 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a.m. (E. S. T.) during October, 1932 [Wind from North=360°; East=90° etc.]

Altitude (meters)	Albuquer- que, N. Mex. (1,528 meters)		Atlanta, Ga. (309 meters)		Bismarck, N. Dak. (518 meters)		Brov ville, (12 m	Tex.	. Vt.		// VV yO.		Chicago, Ill. (195 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Havre, Mont. (762 meters)		Jackson- ville, Fla. (14 meters)		Key West, Fla. (11 meters)	
m. s. l.	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	249 278 288 282 299	0.8 2.4 4.6 5.6 8.1 8.5	331 29 334 264 294 288 289 295 284	1. 1 1. 2 0. 7 2. 3 4. 3 5. 5 6. 9 6. 2 6. 6	312 299 297 304 301 307 291	1. 3 5. 4 7. 1 8. 9 10. 0 12. 2 11. 9	121 138 145	1. 1 2. 6 2. 0 1. 3 0. 5 1. 3 2. 5 0. 6 1. 6	192 206 238 244 270 277 297 322	2. 6 6. 6 7. 0 8. 7 10. 2 12. 3 11. 0 10. 8	289 288 294	7.0 10.4 10.9 11.4 12.7	275 283 244	0. 9 4. 8 7. 0 7. 9 9. 9 10. 1 10. 5	198 230 249 249 255 264 260	3. 0 7. 4 8. 9 8. 9 8. 9 10. 2 9. 8	223 235 254 269 298	0. 2 3. 3 3. 1 4. 6 3. 0 3. 5 4. 9 5. 7	268 265 288 290 293 298 291	2. 0 3. 8 6. 4 7. 4 9. 4 9. 9 11. 2	96 150 224 259 281 297	0.8 1.5 1.1 2.3 3.7 5.2 6.2 9.4	99 105 125 133 131	2.7 6.1 5.0 3.7 2.7 2.2 1.9 0.2 0.8

Temperature and humidity departures based on normals of Due West, S. C.
 Temperature and humidity departures based on normals of Royal Center, Ind.
 Temperature departures based on normals determined by interpolating between those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.
 Naval air stations.
 Temperature and humidity departures based on normals of Drexel, Nebr.
 Surface and 500-meter departures omitted because of difference in time between airplane observations and those of kites, upon which the normals are based.

Weather Bureau airplane observations made near 5 a. m.; Navy airplane observations near 7 a. m.; Ellendale kite observations near 9 a. m. (seventy-fifth meridian time).

Table 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a. m. (E. S. T.) during October, 1932— Continued

Los Angeles, Calif. (217 meters)	Medford, Oreg. 410 meters)	Memphis, Tenn. (83 meters)	New Orleans, La. (25 meters)	Oakland, Calif. (8 meters)	Oklahoma, City, Okla. (402 meters)	Omaha, Nebr. (306 meters)	Phoenix, Ariz. (356 meters)	Salt Lake City, Utah (1,294 meters)	Sault Ste. Marie,Mich. (198 meters)	Seattle, Wash. (14 meters)	Washing- ton, D. C. (10 meters)
Surface 10 1.1 500 39 1.8 1,000 51 2.6 1,500 42 2.3 2,000 10 2.4 2,500 5 2.2 3,000 356 2.8	o 73 0.3 6 0.1 241 0.2 241 0.2 241 0.2 340 1.7 339 3.6 320 4.6 320 4.6 312 5.6	Direction Color C	0 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9	Color of the color	uo location (10 location) (10	Rojtoolo A 331 0.7 284 1.5 287 6.7 282 6.7 282 6.7 282 8.9 276 8.1 279 8.9 303 8.5	uojipaji 98 1.6 86 2.5 68 2.2 96 1.1 184 1.3 230 2.1 227 2.5 248 5.3	To Day 100 A	notype in Grant State St	Hoporosis A	Column C

RIVERS AND FLOODS

By RICHMOND T. ZOCH

[River and Flood Division, Montrose W. Hayes in charge]

In October there were floods in the Atlantic Coast and East Gulf States and in Texas; those in Texas, however, may be considered a continuation of the September overflows which were mentioned in the Monthly Weather REVIEW of that month.

The most noteworthy of all the floods of both September and October were those in the lower Rio Grande The following summary concerning them has been furnished by the official in charge of the Weather Bureau office in Brownsville, Tex.:

Torrential and probably unprecedented rains in Val Verde and adjacent counties in Texas during the last two days of August and the first day of September, and heavy to excessive rains over the Rio Grande and tributary watersheds below Del Rio later in September and early in October caused destructive floods in the lower reaches of the Pecos and Devils Rivers, and in the Rio Grande from Del Rio, Tex., to the Gulf of Mexico. The floods began early in September and lasted well into October in the lower Rio Grande Valley

Record-breaking crest stages occurred in practically all of the reach from Del Rio to Brownsville.

On account of a rather long and severe dry spell in southern On account of a rather long and severe dry spell in southern Texas, occurring somewhat earlier than usual, few fall crops had been planted. This minimized the flood damage, but still the loss of property was enormous in the aggregate, and is conservatively estimated to have been more than \$2,500,000 on the American side of the river. In addition, 10 or 12 lives were lost.

The value of all classes of property, including levees, that was saved by the timely warnings and accurate crest stage forecasts is even more difficult to estimate, but would undoubtedly approximate \$500,000. Besides, at least some lives were saved.

The losses due to suspension of business appear to have been

The losses due to suspension of business appear to have been offset in a large measure by the employment the flood created for many people who otherwise would have been unemployed.

Table of flood stages in October, 1932 [All dates in October unless otherwise specified]

River and station	Flood	Above stages-		Crest			
	stage	From-	То	Stage	Date		
ATLANTIC SLOPE DRAINAGE	Feet			Feet			
Chenango: Sherburne, N. Y Susquehanna:	8	6	7	8. 7	6.		
Oneona, N. Y.	12	6	8	14.7	7.		
Bainbridge, N. Y	11	6	8	13.0	7.		
Columbia, Va	18	18	20	27.3	18.		
Richmond, Va	8	19	20	14. 2	19.		

Table of flood stages in October, 1932-Continued

River and station	Flood	Above stages-		Crest			
	stage	From-	То	Stage	Date		
ATLANTIC SLOPE DRAINAGE—con.							
Dan:	Feet			Feet			
Danville, Va Clarksville, Va	8	18	19	13. 5	18.		
	12	20	20	14.3	20.		
Randolph, Va	18	18	20	28. 9	19.		
Weldon, N. C	31	19 20	22 24	42. 7 30. 1	21. 23.		
Williamston, N. C.	23 9	26	31	11. 2	28.		
Cape Fear: Elizabethtown, N. C.	20	19	21	24.9	20.		
Lynches: Effingham, S. C	14	23	25	15. 3	24.		
	27	18	22	33.7	20.		
Cheraw, S. C. Mars Bluff Bridge, S. C	17	20	28	20.9	24.		
Poston, S. C.	18	25	30	20. 3	27.		
Saluda: Pelzer, S. C	6	16	19	11.0	17.		
Chappells, S. C.	12 14	16	$\frac{21}{19}$	20.4 27.8	19. 18,		
Congaras Columbia S C	15	16 17	19	21.7	19,		
Catawba-Wateree:							
Catawba, S. C	11 23	17 19	18 20	16. 5 25. 5	18. 20.		
Santaa.		19	20	20.0	20.		
Rimini, S. C	12	18	27	18.9	22.		
Ferguson, S. C.	12 12	20 26	31 31	14. 0 16. 1	23-24. 30.		
Savannah:		20		1	1		
Calhoun Falls, S. C	. 8	17	17 24	$\begin{vmatrix} 11.6 \\ 22.7 \end{vmatrix}$	17. 21.		
Ellenton, S. C.	14	18	24	· 22.1	21.		
EAST GULF OF MEXICO DRAINAGE							
Black Warrior: Lock 10, Tusca-	46	17	20	61.4	18.		
loosa, Ala.				1	ł		
Tombigbee: Aberdeen, Miss	34	18	22	37. 4	19.		
Columbus, Miss	25	20	21	25. 5 56. 6	20. 26.		
Lock 4, Demopolis, Ala Lock 3, Ala	39 33	17 17		56.8	27-28.		
Lock 2. Ala	46	18	(i)	57. 5	29.		
Lock 1, Ala	31	18	(1)	38. 6 20. 9	Nov. 1.		
Lock 1, Ala Chickasawhay: Enterprise, Miss Pearl: Jackson, Miss	20	18 20	31	23. 2	18. 28.		
MISSISSIPFI SYSTEM							
Ohio Basin							
		1.7	,,,	.,	177		
Pigeon: Newport, Tenn French Broad: Asheville, N. C.	6 4	17	17	8.1 6.5	17. 18.		
Elk: Fayetteville, Tenn	14	16	17	20.0	17.		
WEST GULF OF MEXICO DRAINAGE							
West Fork: Fort Worth, Tex		Sept. 5	Sept. 5	30. 7	Sept. 5.		
Trinity: Dallas, Tex	28	Sept. 6	Sept. 8	34. 0	Sept. 7.		
Long Lake, Tex		Sept. 8	Sept. 9				
Nueces:	1	Sept. 4	Sept. 12	27.0	Sept. 7.		
Cotulla, TexThree Rivers, Tex	35		Sept. 16		Sept. 14.		
•	•	•	•				